

## **Amendments to the Claims:**

This listing of claims will replace all previous versions of the claims:

- 1 (Previously Presented) A magnetic sensor comprising:  
a multilayer film having a first antiferromagnetic layer, a fixed magnetic layer, a nonmagnetic material layer, and a free magnetic layer in that order from a bottom; and  
second antiferromagnetic layers provided on two side portions of the free magnetic layer in a track width direction, wherein back end surfaces of the second antiferromagnetic layers in a height direction, which are in regions in which exchange coupled magnetic fields are generated, are each located at least at a position closer to a face opposing a recording medium than a back end surface of a central portion of the free magnetic layer in the height direction, the central portion being located between the two side portions.
- 2 (Previously Presented) The magnetic sensor according to Claim 1, wherein a third antiferromagnetic layer is provided on the free magnetic layer, thereby the second antiferromagnetic layers being on two side portions of the third antiferromagnetic layer in the track width direction.
- 3 (Previously Presented) A magnetic sensor comprising:  
a multilayer film having a first antiferromagnetic layer, a fixed magnetic layer, a nonmagnetic material layer, and a free magnetic layer in that order from a bottom;  
an insulating layer extending on at least two side portions in a width direction of the free magnetic layer in a back region along a height direction; and  
second antiferromagnetic layers provided on the two side portions from a face opposing a recording medium to the insulating layer.
- 4 (Previously Presented) The magnetic sensor according to Claim 3, wherein a third antiferromagnetic layer is provided on the free magnetic layer, thereby the insulating layer extending on two side portions of the third antiferromagnetic layer in the back region along the height direction, and

the second antiferromagnetic layers being on the two side portions of the third antiferromagnetic layer from the face opposing a recording medium to the insulating layer.

5 (Original) The magnetic sensor according to Claim 3, wherein the insulating layer is formed to extend in the height direction further from a back end surface of the multilayer film in the height direction.

6 (Currently Amended) The magnetic sensor according to Claim 2, wherein a nonmagnetic layer is provided at least one of between the free magnetic layer and the insulating layer in the thickness direction ~~and/or~~ between a third antiferromagnetic layer and the insulating layer.

7 (Original) The magnetic sensor according to Claim 6, wherein the nonmagnetic layer comprises at least one element selected from the group consisting of Ru, Re, Pd, Os, Ir, Pt, Au, Rh, and Cr.

8 (Original) The magnetic sensor according to Claim 2, wherein the third antiferromagnetic layer is formed so as to have a thickness of 20 to 50 Å.

9-13. (Cancelled)